

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A fuel injector comprising:

a valve body provided with a fuel injection hole and for opening and closing a fuel passageway between said injection hole and a valve seat provided at the upstream end of the injection hole, and

a means for driving said valve body,

means provided at an upstream end of the injection hole for generating a swirl flow to fuel passing through said injection hole; and

~~wherein said fuel injector is characterized in that a restraint means for restraining the flow of a fuel, is provided downstream with respect to the injection hole and outside said injection hole, in that said flow~~wherein said restraint means restrains the flow of the fuel~~radial spreading of the swirled fuel passing through the injection hole~~ in at least two places and splits the swirled fuel into portions high in the spraying density of the injected swirled fuel and portions low in the ~~sprayed~~spraying density of the injected swirled fuel, in that the split portions of the fuel that are high in spraying density differ from each other in terms of quantity, and in that the restraint means includes a component for generating a swirl flow.

2. (Currently Amended) A fuel injector according to Claim 1, wherein said fuel injector is characterized in that a wall surface for restraining the flow of the fuel

in its radial direction is provided as said flow restraint means along, and downstream with respect to, the injection hole, in that a plurality of restraint areas for restraining the flow of the swirled fuel in its radial direction and a plurality of release areas for enabling the swirled fuel to flow in its radial direction are provided, and in that said release areas differ from each other in terms of size.

3. (Currently Amended) A fuel injector according to Claim 1, wherein said fuel injector is characterized in that a plurality of wall surfaces almost parallel to the central axis of the injection hole for limiting the flow of the injected swirled fuel are provided as said flow restraint means, in that a plurality of limitation areas for limiting the flow of the swirled fuel in its radial direction and a plurality of release areas for enabling the swirled fuel to flow in its traveling direction are provided, and in that said release areas differ from each other in terms of size.

4. (Currently Amended) A fuel injector comprising:
a valve body provided with a fuel injection hole and for opening and closing a fuel passageway between said injection hole and a valve seat provided at the upstream end of the injection hole, and

a means for driving said valve body, and
means provided at an upstream end of the injection hole for generating a swirl flow to fuel passing through said injection hole; and

wherein said fuel injector is characterized in that a wall surface is provided which restricts the radial spread of the swirled fuel passing through said injection hole, said wall surface being almost parallel to the central axis of the injection hole

~~is~~and provided downstream with respect to and at the marginal portions of the injection hole so that said wall surface is positioned outside, and at a required distance from, the inner wall of the injection hole, in that a plurality of circumferential areas around the inner wall of the injection hole are provided so that the distance from said wall surface to the inner wall of the injection hole is longer than the required distance, and in that said circumferential areas differ from each other in terms of size, ~~and in that a component is provided for generating a swirl flow.~~

5. (Currently Amended) A fuel injector according to any one of Claims 1 to 4, wherein said fuel injector is characterized in that, during the spraying of the fuel which has been injected from said injection hole, the density distribution of the sprayed fuel at a cross section vertical to the body axial line of the fuel injector concentrates in approximately two directions, and in that the spraying pattern of the fuel is set to ensure that the flow rate of the sprayed fuel in one of the two directions of concentration is greater than the flow rate of the fuel in the other direction.

6. (Previously Presented) A fuel injector according to any one of Claims 2 to 4 above, wherein said fuel injector is characterized in that more than one wall surface parallel to the central axis of said injection hole is provided downstream with respect to the injection hole and in that at least one of said wall surfaces and the inner wall of the injection hole take an almost abutting-angle relationship at a position closest to said at least one wall surface.

7. (Previously Presented) A fuel injector according to Claim 2, wherein said fuel injector is characterized in that more than one wall surface parallel to the central axis of said injection hole is provided downstream with respect to the injection hole and in that at least one of said wall surfaces is positioned so that the corresponding wall surface and the inner wall of the injection hole take an almost right-angle or acute-angle relationship at the position closest to that wall surface.

8. (New) A fuel injector comprising:

a valve body provided with a fuel injection hole and for opening and closing a fuel passageway between said injection hole and a valve seat provided at the upstream end of the injection hole,

a drive mechanism to drive said valve body,

a fuel swirl generator provided at an upstream end of the injection hole to generate a swirl flow in fuel passing through said injection hole; and

restraint walls to restrain the flow of a fuel, said restrain walls being provided downstream with respect to the injection hole and outside said injection hole, wherein said restraint walls restrain radial spread of the swirled fuel passing through the injection hole in at least two places and split the swirled fuel into portions high in spraying density of the injected swirled fuel and portions low in spraying density of the injected swirled fuel, wherein the split portions of the fuel that are high in spraying density differ from each other in terms of quantity.

9. (New) A fuel injector according to Claim 1, wherein said fuel injector further comprises a plurality of release areas to enable the swirled fuel to flow in its

Application No.: 09/989,068

Docket No.: 503.40884X00

radial direction, wherein said release areas differ from each other in terms of size and are formed in areas between said restraint walls.